

10/579084

1AP20 Rec'd PCT/PTO 12 MAY 2006

GKN Driveline International GmbH

5th December 2003

Hauptstrasse 130

Ne/bec (20030386)

53797 Lohmar

Q03043W000

Axial setting device with torque determining means

Claims

1. A method of determining the coupling torque in a friction coupling with an electro-mechanical actuator which actuator comprises a supporting element axially supported in a housing and an axially displaceable setting element supported on said supporting element,

characterised in

that the supporting element is axially supported in the housing via an undisplaceably enclosed hydraulic medium and that the pressure in the hydraulic medium is measured and used by means of value tables for the actuator and the friction coupling for the purpose of calculating the coupling torque in a central ECU.

2. A method according to claim 1,

characterised in

that the axial force of the actuator and the supporting force of the supporting element respectively are calculated on the basis of the pressure in the hydraulic medium, using a stored value for the effective face of the supporting element.

3. A method according to claim 2,

characterised in

that the coupling moment is calculated, using stored values for the friction value and that the friction face of the friction coupling is calculated on the basis of the axial force of the actuator and the supporting force of the supporting element respectively.

4. A method according to any one of claims 1 to 3,

characterised in

that the pressure in the hydraulic medium is controlled in a closed control circuit by setting the actuator to a respective nominal value.

5. A friction coupling (15) with an electro-mechanical actuator (29), more particularly for being used in a lockable differential drive or as a hang-on coupling for an optionally drivable driving axis of a motor vehicle, wherein the actuator (29) comprises a supporting disc (35) axially fixed in a housing (11) and an axially displaceable setting disc (34) being axially supported on said supporting disc (35),

characterised in

that the supporting disc (35) is provided in the form of an annular piston in an annular chamber (36) filled with a hydraulic medium and that, in the housing (11), there is arranged a pressure sensor element (40, 60) for measuring the hydraulic pressure in the annular chamber

(36).

6. A coupling according to claim 5,

characterised in

that the pressure sensor element (40) is connected to a branch line (37, 39) leading to the annular chamber (36).

7. A coupling according to claim 5,

characterised in

that the pressure sensor element (60) is introduced directly into the annular chamber (36).

8. A friction coupling (15) with an electro-mechanical actuator (29), more particularly for being used in a lockable differential drive or as a hang-on coupling for an optionally drivable driving axis of a motor vehicle, wherein the actuator (29) comprises a supporting disc (35) axially fixed in a housing (11) and a displaceable setting disc (34) which is axially supported on said supporting disc (35),

characterised in

that the supporting disc (35) is provided in the form of an annular plunger and that into the housing (11) there is inserted an annular housing (51) with a cover 54, which annular housing and cover form an annular chamber (36') which is filled with a hydraulic medium and in which there is arranged a pressure sensor element (60)

for measuring the hydraulic pressure in the annular chamber (36'), wherein the annular plunger acts on the cover (54).

9. A coupling according to claim 7,

characterised in

that the cover (54) is provided in the form of a flexible diaphragm.

10. A coupling according to claim 7,

characterised in

that the cover (54) is displaceable in the annular chamber (36') and sealed relative thereto.

11. A coupling according to any one of claims 5 to 10,

characterised in

that the supporting disc (35) is sealed relative to the annular chamber (36) and the cover (54) relative to the annular chamber (36') respectively, in both cases by sealing rings (52, 53).

12. A coupling according to any one of claims 5 to 11,

characterised in

that the hydraulic medium forms an elastic formed member.